

BRUNO ADAMI SERINE

**THE ENTREPRENEUR IS A SCIENTIST: THE
SCIENTIFIC METHOD BEHIND STARTUP
BUILDING AND HOW TO APPLY IT TO
BENEFIT HUMANITY AT THE SCALE**

Italy
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Major:

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Prof. Elisa Ughetto

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First and foremost, I would like to express my sincere gratitude to my family and beloved ones for their unwavering support and encouragement. Their love and support are an unlimited source of motivation.

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Thank you all for making this thesis possible.

ABSTRACT

Entrepreneurs can deliver innovation at scale and alter the course of humanity. However, according to research released by CBInsights [1], 35% of the failures of startups analyzed reported a lack of market need for their solution, while only 8% presented low-quality products. Thus, it is clear that, at this moment in history, developing a quality product or service can be easier than ensuring that people want it.

Therefore, the thesis's objective is to propose a method of developing startups capable of maximizing the probability of making something people want, distributing it on a large scale, and obtaining financial returns.

Since August 2019, the study of multiple books, articles, courses, and videos, combined with the practice of entrepreneurship, have enabled the development of the proposed method. During this period, I started to develop my startup, called Umatch, which quickly expanded throughout Brazil and, in November 2022, surpassed the mark of 200 thousand users. In addition, we released it at the University of São Paulo, and more than 16,000 students from this university have already used the product.

As a result, I developed the Scientific Entrepreneur Method. In this, we understand the entrepreneur as a scientist who seeks to validate the central hypothesis for creating a startup: the existence of a Business Triad capable of meeting a specific market demand on a scale. Then, the scientific method - observation, reason, and testing - is used to develop a Product, a Business Model, and a Distribution that profitably fit the Market and each other.

Any entrepreneur who wants to develop a new product for society and distribute it at scale can apply the method.

Keywords – entrepreneurship, startup, business model, business triad, product, distribution, growth marketing, product development, scientific method.

EXECUTIVE SUMMARY

The thesis "The Entrepreneur is a Scientist" investigates the critical role of entrepreneurs in delivering innovation and shaping the future of humanity. This research addresses a pivotal challenge in the startup ecosystem: developing products or services that people genuinely need. A staggering 35% of startup failures are attributed to a lack of market need, underscoring the importance of aligning product development with market demand.

This thesis introduces the "Scientific Entrepreneur Method," conceptualized through extensive research and practical entrepreneurship experience, particularly through the development of Umatch, a startup that garnered significant user engagement across Brazil. This method positions the entrepreneur as a scientist, whose primary objective is to validate the central hypothesis of creating a startup: the existence of a Business Triad that meets a specific market demand at scale. The approach leverages the scientific method—observation, reasoning, and testing—to develop a product, business model, and distribution strategy that synergistically fit the market.

Key components of the method include the "Business Triad," encompassing market, product/service, and distribution, and differentiating between Small and Medium Enterprise (SME) Entrepreneurship and Innovation-Driven Enterprise (IDE) Entrepreneurship. The method is exemplified through the case study of Umatch, showcasing the application of the Scientific Entrepreneur Method in a real-world scenario.

The thesis concludes with insights into the implications of applying the Scientific Entrepreneur Method. It serves as a framework for entrepreneurs aiming to develop and distribute new products or services effectively. The findings of this study contribute to the field of entrepreneurship by offering a structured approach to startup development, emphasizing the importance of market alignment, and providing a blueprint for future entrepreneurial endeavors.

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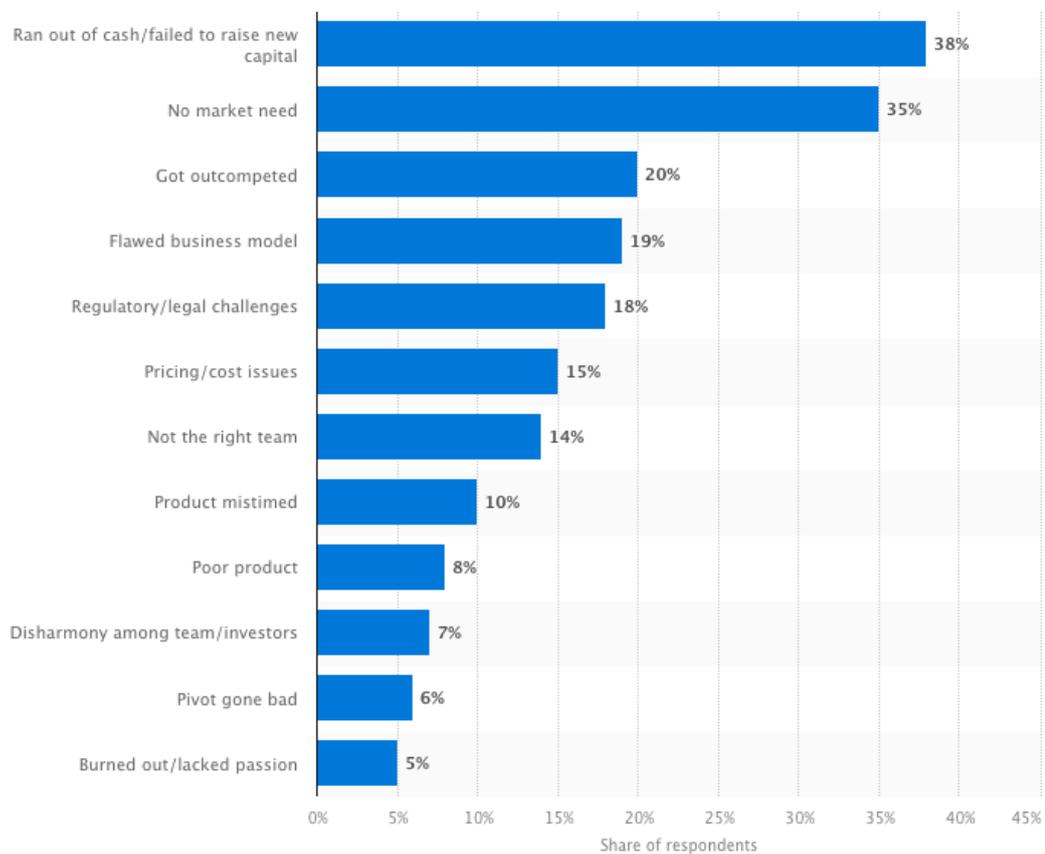
PART I

INTRODUCTION: WHY THIS IS IMPORTANT

1 INTRODUCTION: WHY THIS IS IMPORTANT

Entrepreneurs can provide innovation and generate jobs. However, whether this innovation, as a product or Service, can benefit humankind depends on multiple factors determining a new endeavor's success or failure. By analyzing the failure of 111 startups since 2018, CBI Insights published research in August 2021 naming the top twelve reasons startups fail. Exhibit 1 displays the results of this research, which adds up to more than 100% because, typically, there's more than one reason for a startup failure.

Figure 1: Top 12 reasons startups fail



Source: Study published by Statista [2].

By analyzing 1, it's clear that the second most common reason for a startup failure is "No market need," which was present in 35% of the losses. On the other hand, when we analyze the product quality, we see that a "Poor product" was present in only 8% of all the startup failures studied. This comparison evidences a clear conclusion: most startup failures analyzed produced great products nobody wanted. Therefore, the dedication of time and effort to perfecting a process capable of maximizing the chances of making something people want in the first place seems worthwhile. As a result, this essay aims to produce an entrepreneurship framework based on applying the scientific method to startup building and evidence of how my team and I used it to build Umatch and acquire hundreds of thousands of users.

PART II

CONCEPTUAL FOUNDATIONS

2 CONCEPTUAL FOUNDATIONS

The present section aims to explain the conceptual foundations that are elementary to understanding the Scientific Entrepreneur method application.

2.1 How to talk to users

One of the most important skills an entrepreneur must excel at is talking to users. As further written, it's core to validate the idea and the prototype and to iterate it. Rob Fitzpatrick wrote a great book about how to do it [3]. He describes three fundamental concepts on it:

1. Talk about their life instead of your idea;
2. Ask about specifics in the past instead of generics or opinions about the future;
3. Talk less and listen more.

These three fundamental concepts are vital to validating whether the questions produced to ask users will be capable of producing excellent results. Furthermore, it's also essential to avoid three types of insufficient data:

1. Compliments;
2. Fluff (generics, hypotheticals, and the future);
3. Ideas.

Sometimes insufficient data is created by asking the wrong questions. For example, it could happen because the entrepreneur got excited and started pitching because he had to discuss it and explain the reason for the meeting [3].

These things happen. Once one starts to notice, it is easy to get back on track by deflecting compliments, anchoring fluff, and digging beneath ideas. Another strategy is for the entrepreneur to pre-plan the three most important things he wants to learn from any given type of person.

Pre-planning the big questions makes it much easier to ask questions that pass the three fundamental concepts presented and are not biasing. It also makes it easier to face the questions that hurt.

If someone goes through a random conversation, it tends to focus on trivial stuff, which keeps the conversation comfortable.

The referred bibliography [3] deserves a complete reading, but the fundamentals presented here can go a long way.

2.2 MVP: Minimal Viable Product

The term Minimum Viable Product (MVP) was coined and defined in 2001 by Frank Robinson and then popularized by Steve Blank and Eric Ries [4]. A minimum viable product (MVP) is a product's version with just enough features to be usable by early customers, who can then provide feedback for future product development.

It's essential to notice that an MVP is not part of a product. Instead, **it is a complete product because it can deliver a particular desired value for a customer.** Therefore, you first decide what value you want to test. Then, you develop a minimum viable product, the minimum product you need to produce to deliver the refereed value and then measure the results to learn whether you confirmed the value hypothesis.

A focus on releasing an MVP means you avoid lengthy and (possibly) unnecessary work. Instead, you'll iterate on working versions and respond to feedback, challenging and validating assumptions about a product's requirements.

We can distinguish between two types of MVPs:

1. Soft MVPs;
2. Hard MVPs.

Soft MVPs are the case when you can create a simplified version of your product and release it in a matter of months. On the other hand, Hard MVPs are the ones where you

cannot produce this simplified version of your product in a matter of months. In such cases, entrepreneurs need to be creative about validating their core value hypothesis, like creating a website that explains what they do and selling pre-ordered items, for example.

PART III

THE METHOD

3 THE SCIENTIFIC ENTREPRENEUR METHOD

The current section explains why the entrepreneur is a scientist and the method proposed by this essay.

3.1 Why the Entrepreneur is a Scientist

Before understanding an entrepreneur as a scientist, one must first understand what an entrepreneur and a scientist are.

An entrepreneur is an individual who creates a new business, bearing most of the risks and enjoying most of the rewards [5]. On the other hand, according to the Science Council, a scientist is a person that systematically gathers and uses research and evidence to make hypotheses and test them to gain and share understanding and knowledge [6].

Therefore, stating that an entrepreneur is a scientist means that a company founder should face some hypothesis, use discovered evidence to validate it, and produce knowledge to succeed. So, the question then becomes: what is the assumption faced by all entrepreneurs, so they must use evidence to validate or refute it to create a thriving business? The present section aims to answer this question. The first step is to take a first-principles approach and state what is mandatory for any business to exist: **The Business Triad**.

3.1.1 The Business Triad

At CalTech, Richard Feynman told his students that "If, in some cataclysm, all of scientific knowledge were to be destroyed, and only one sentence passed on to the next generations of creatures, what statement would contain the most information in the fewest words? I believe it is the atomic hypothesis (or the atomic fact, or whatever you wish to call it) that all things are made of atoms—little particles that move around in perpetual

motion, attracting each other when they are a little distance apart, but repelling upon being squeezed into one another. In that one sentence, you will see, there is an enormous amount of information about the world, if just a little imagination and thinking are applied.” [7]

We can apply this same kind of first-principles thinking to a company. In that case, a paying customer is the only necessary, and sufficient condition for a business [8]. With just a little imagination and thinking applied, this statement has enormous information. A paying customer demands four things to exist:

1. A customer with enough money;
2. Something that delivers a value the customer is willing to pay for;
3. A way to capture some of the value created as payment(s) from the customer;
4. A channel through which the customer discovers the thing.

Note that without these four elements, there’s no paying customer. First, the transaction ceases if we remove the customer with enough money. Second, if the thing he is paying for doesn’t exist, he won’t settle for anything. Third, there’s no payment to the company without a way of capturing part of the value. Finally, the thing needs to be discovered by the customer; otherwise, he doesn’t know about its existence. With the four cited elements, however, a paying customer exists. A step further, we must generalize the four elements so it can repeatedly happen to enable multiple customers. Therefore, four things must exist so numerous customers are paying for the same thing:

1. **Market:** a set of customers willing to pay for the Product or Service;
2. **Product or service:** is the repeatable something that each customer is paying for;
3. **Business Model:** a framework by which you extract from your customers some portion of the value your product creates for them [8];
4. **Distribution:** it’s the set of channels by which the business distributes its product to the customer.

However, generally, the Market is not in control of the company, so it must design three things to become a business: Product or Service, Business Model, and Distribution. Indeed, the design of these three things, in the right balance - as I will further explain -

are so crucial that they are the building blocks of what Marc Andreessen, the co-founder of Netscape, defined as "the only thing that matters" to a startup: product/market fit. He describes it as being in a good market with a product that can satisfy that Market and further explains: "The customers are buying the product just as fast as you can make it - or usage is growing just as fast as you can add more servers. Money from customers is piling up in your company checking account." [9]

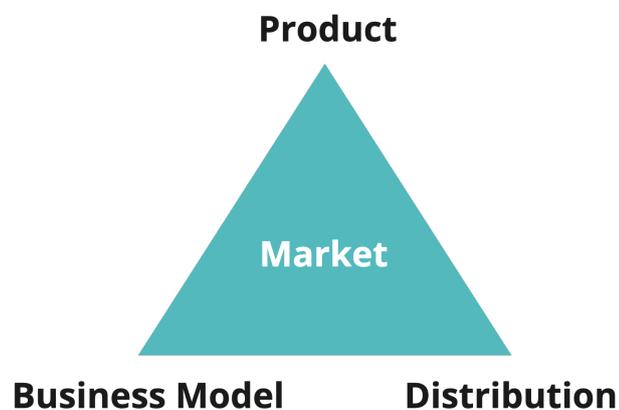
Therefore, note the three underlying things happening in his definition:

- **"The customers are buying the product"**: the product created by the company satisfied the market need;
- **"Usage is growing just as fast as you can add more servers"**: a lot of people are getting to know about the product, so it got Distribution right;
- **"Money from customers is piling up"**: there's a form of getting financial returns from the value created by the product. In other words, there's a Business Model.

Another famous American entrepreneur, Drew Houston, co-founder and CEO of Drop-Box, put it in other words: *You have to be good at building a product, then you have to be just as good at getting users, then you have to be just as good at building a business model. If you're missing any of the links in the chain, the whole chain is broken.* [10]

To recap, we started from a simple business "atom" - a paying customer - and with some creativity and real-world evidence, we reached the business framework that enables the company to capture these atoms in scale: the triad Product-Distribution-Business Model. Or, as I propose: The Business Triad.

Figure 2: The Business Triad and the market it serves



Source: Author's compilation.

Therefore, an entrepreneur will use evidence to validate his central hypothesis: the fit of a particular Business Triad to a specific Market. Nevertheless, the difficulty and uncertainty associated with discovering the right Business Triad for a particular Market vary profoundly between two types of Entrepreneurship: Small and Medium Enterprise (SME) Entrepreneurship and Innovation-Driven Enterprise (IDE) Entrepreneurship.

3.1.2 Two Types of Entrepreneurship

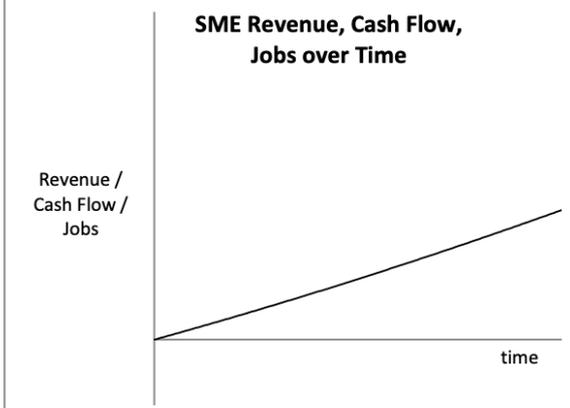
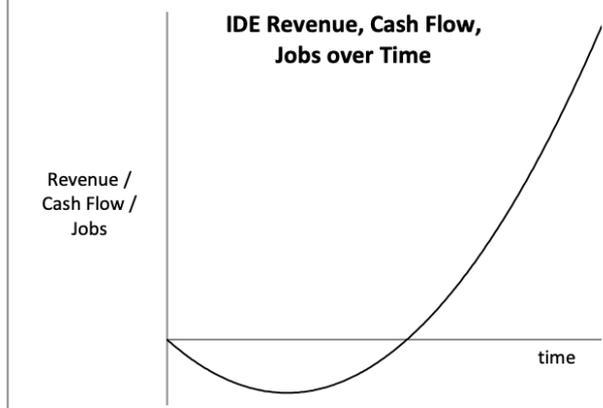
There are two main types of entrepreneurship: Small and Medium Enterprise (SME) Entrepreneurship and Innovation-Driven Enterprise (IDE) Entrepreneurship.

Small and Medium Enterprise (SME) is the type of business that likely one person started to serve a local market and grew to be a small or medium-sized business that benefits this regional Market. It is most often closely held, likely a family business, where close control of a small business is essential. The business "rewards" for these founders are primarily in the form of personal independence and cash flow from the company. These businesses generally do not need to raise as much money, so when investors inject capital into these businesses, the resultant increase in revenue and jobs created is relatively rapid. The key distinguishing factor is their focus on local markets. [8]

On the other hand, Innovation-driven enterprise (IDE) entrepreneurship is the riskier and more ambitious of the two. IDE entrepreneurs aspire to serve markets that go well beyond the local Market. They are looking to sell their offering at a global or regional level. These entrepreneurs usually work in teams where they build their business off some technology, process, business model, or other innovation that will give them a significant competitive advantage compared to existing companies. They are interested in creating wealth more than they are interested in controlling, and they often have to sell equity in their company to support their ambitious growth plans. While they are often slower to start, IDE entrepreneurs tend to have more impressive exponential growth when they get customer traction. Growth is what they seek. It's more of a "go big or go home." They must become big and fast-growing to serve global markets to achieve their ambitions. [8]

The figure below explains the main characteristics of the two types of entrepreneurship proposed by Bill Aulet and Fiona Murray.

Figure 3: The two types of entrepreneurship

SME Entrepreneurship	IDE Entrepreneurship
Focus on addressing local and regional markets only.	Focus on global markets.
Innovation is not necessary to SME establishment and growth, nor is competitive advantage.	The company is based on some sort of innovation (tech, process, business model) and potential competitive advantage.
“Non-tradable jobs”—jobs generally performed locally, e.g. restaurants, dry cleaners, service industry.	“Tradable jobs”—jobs that do not have to be performed locally.
Most often family businesses or businesses with very little external capital.	More diverse ownership base including wide array of external capital providers.
The company typically grows at a linear rate. When you put money into the company, the system (revenue, cash flow, jobs, etc.) will respond quickly in a positive manner.	The company starts by losing money, but if successful will have exponential growth. Requires investment. When you put money into the company, the revenue/cash flow/jobs numbers do not respond quickly.
	

Source: Produced by Bill Aulet and Fiona Murray [8]

The IDE company is what we currently know as a startup. Paul Graham, a founder of Y Combinator, the biggest startup accelerator in the world, defined a startup as ” a company designed to grow fast [11].” As he states, some of the newly founded companies are startups. However, most are service businesses — restaurants, barbershops, plumbers, etc. In other words, Small and Medium Enterprises.

Because Startups (i.e., IDEs) seed to snowball, they need to make something that a significant market wants to pay for and serve all those customers, which is intrinsically different from coming up with an idea for an SME. Because SMEs serve local Markets, that geographic constraint helps define your company and protects you from the competition. For example, opening a Barber in a specific neighborhood is a good enough idea to start

a small business.

Nevertheless, someone may have to think of something novel to start a startup because a significant competitive advantage is necessary to sustain the company on a global market. And, as Paul Graham states, "ideas of that type are so valuable that all the obvious ones are already taken [11]." Because of this, **you are building a Startup is like deciding to be a research scientist. You're committing to try to discover a Business Triad that no one knew before, and, like any scientist, you may find it or not.** Therefore, this essay's focus is to present a way of applying the scientific method to Startup building to maximize the chances of building something people want.

3.2 The Method

Once you already understand the entrepreneur as a scientist and what he is trying to discover, the next step is to define the Scientific Entrepreneur Method proposed by the present thesis and how to apply it to build a startup.

As Richard Feynman said in his lessons, "the principle of science, the definition, almost, is the following: The test of all knowledge is experiment. [7]" Therefore, as a scientific entrepreneur, the rule underlying the present method is to follow the principle of science: **to not take things for granted because the only test of knowledge is an experiment.**

Further, the Scientific Entrepreneur method involves dividing a startup journey into three main phases and applying the Scientific method - observation, reason, and experiment [12] - towards its life cycle to discover and iterate its Business Triads, i.e., the Business Triad of each product. In this sense, by applying the proposed method, the entrepreneur will need to discover and refine a Business Triad for every new product the startup launches, so it's a continuous cycle.

3.2.1 The Three Phases of a startup

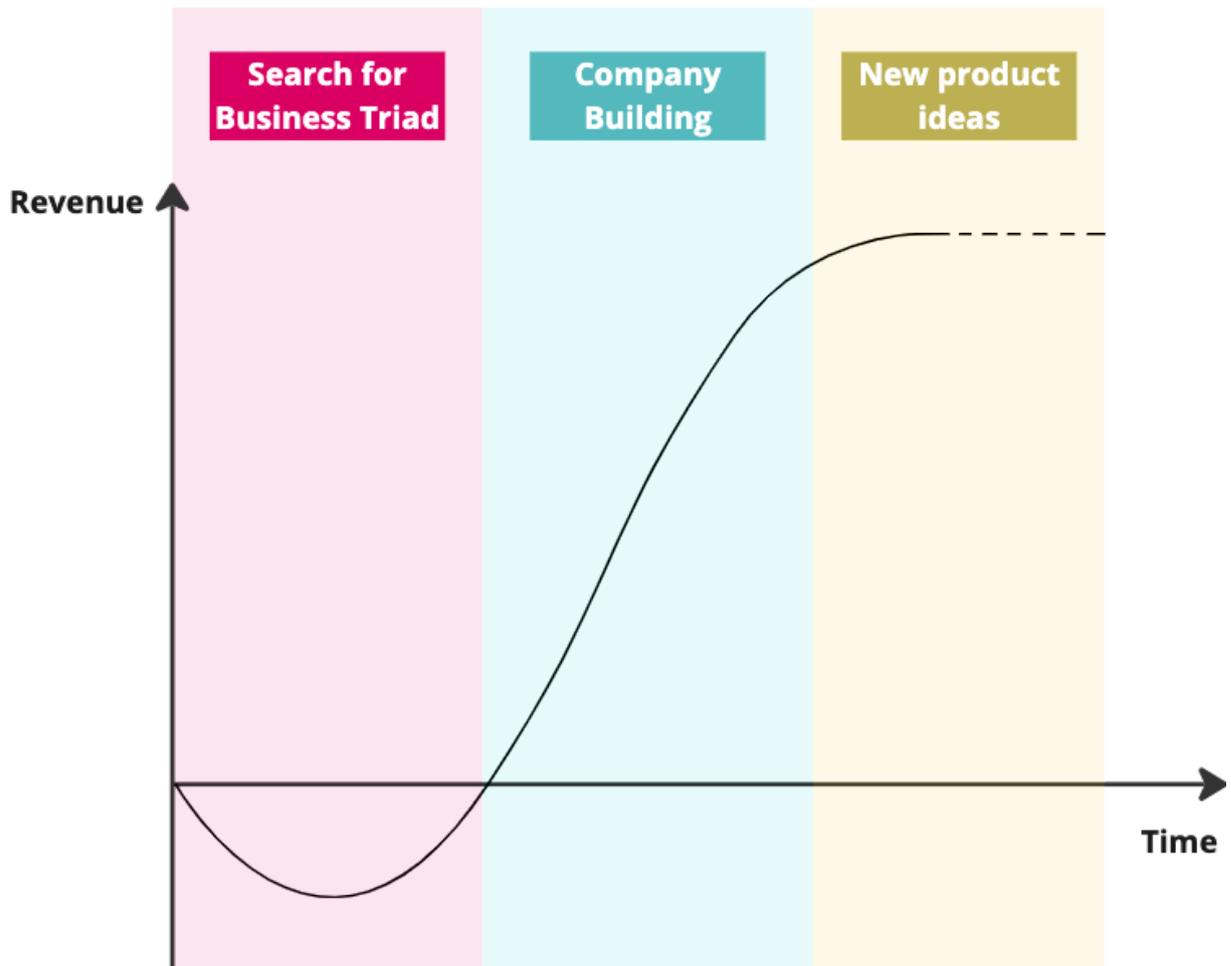
At the beginning of a startup, resources are scarce. Therefore, focusing on the right things can make the difference between life and death for your company. Each phase defines the main focus of the entrepreneur/founder/CEO, so he can minimize the input and maximize the output. The three phases are:

1. Business Triad Search;

2. Company Building;
3. New products.

The figure below displays the three proposed phases by time and revenue.

Figure 4: The three phases of a startup



Source: Author's compilation.

The following subsections present each phase in detail and some frameworks one can use.

3.2.2 Phase 1: Business Triad Search

As already mentioned, the hypothesis the startup early team must validate is a Business Triad for a specific market. To do so, we'll utilize observation, reason, and experiment, which, as Richard Feynman said in his Introduction to Physics lessons, make up what we call the scientific method [12].

3.2.2.1 Idea, Team, and Money

The first step is to observe how things work today, that is, how people already solve specific problems and the existing ones in a particular area through market research, to then reason about and generate a hypothesis, i.e., startup ideas. Therefore, you should start with the problem to generate your startup idea, which is a hypothesis of why your company could snowball. Furthermore, it's a great tool to begin by evaluating the argument for significant indicators that it's possible to find a Business Triad while pursuing this idea or that, at least, it is worth pursuing.

A Startup Idea is composed of three parts [11]:

- **Problem:** the initial conditions that would allow this company to overgrow;
- **Solution:** the experiment that you'll run in these conditions to snowball;
- **Insight:** the initial explanation of why the investigation will be successful.

The counterintuitive part is that you should start with something other than the solution. If you start with the solution, you'll need to find a problem to fit it. However, a startup solution typically needs to morph and transform itself until it can solve the Problem.

While answering an insult he received during a presentation, Steve Jobs stated that difficulty when he said, "You gotta start with the customer experience and work backward to the technology. You can't start with the technology and try to figure out where you will try to sell it..." [13]. Y Combinator puts it in other words and calls it a "Solution in Search of a Problem [14]."

Therefore, it's good advice to start with the Problem and then develop a solution hypothesis that you're going to test that, if validated, can become the first product or service delivered by your startup.

Furthermore, an excellent framework for evaluating the Problem is to answer the following questions [14]:

- Is the problem Popular? Do more than a million people face it?
- Is the number of people facing the problem growing?
- Is this problem urgent? That means does it need to be solved right now?

- Is the problem expensive to solve?
- Is it mandatory for people to solve this problem?
- Do people frequently face this problem?

To answer this question, the entrepreneur must do one of his most important activities during this phase: talk to users. As already presented in this thesis, you want to follow three main fundamentals when doing so:

- Talk about their life, not your idea;
- Talk specifics, not hypotheticals;
- Listen more, talk less.

With these three great tips in mind, here are also five great questions you can ask to gather data about the problem and the explanations of why they are great:

- What's the most challenging part about [doing this thing]?
 - Tests if the user has pain;
 - Tests if they try to solve in their life;
- Tell me about the last time you encountered that problem.
 - Extract context about the circumstances in which they faced the problem.
- Why was that hard?
- Why was that circumstance that was difficult? The specificities;
 - You understand how to market your product (the user buys the why, not the how).
- What, if anything, have you done to try to solve the problem?
- Are users searching for a solution?
- Who are your competitors?
- What don't you love about the solutions you've already tried?

For more than an idea, an entrepreneur should also put together a team to pursue the endeavor. A great way of thinking about the founding team is to follow the 3H Personality Theory [15]:

- **Hustler:** A hustler is a chief salesman who moves the idea forward by driving business sales. The go-to businessman that generates leads makes deals and gets it all done. They know how to face rejections, who to sell the products to, and what will keep the business ticking over [15];
- **Hacker:** The Hacker is the one who develops the new technology for the business, builds new product prototypes, and works on product development. Also known as the back-end, front-end, or even full-stack developer, the hacker can create algorithms, build intellectual properties and develop new customer technologies [15];
- **Hipster:** The hipster makes the products look market-ready. Designer and creative genius behind the products, which develops product design while being true to the brand for delivering a satisfactory customer experience. The hipster makes the products look market-ready. The hipster makes sure the product details are authentic and marketable [15];

These three personality trait defines what Frank Noiyrigat and Marc Nager called an MVT (Minimum Viable Team) [15].

Finally, it's also crucial to have money to invest in the endeavor. There are three primary sources of funding for startups [16]:

- **Friends and Family:** Though you may be reluctant to ask people close to you for money, keep an open mind about it. It's usually the easiest way to obtain cash at first. In the majority of start-ups, these individuals provide at least part of the initial funding;
- **Angel Investors:** Angel investors are a varied group, though many angels are successful business executives and entrepreneurs who have started and run their own companies. Some are dabblers, making infrequent investments, while others are full-time investors and may invest in a dozen or more enterprises annually. More selective than friends and family, angel investors will do more analysis before committing funds. They usually invest in the early stages of a venture, and they also tend to negotiate terms that will meet their requirements. You will usually need

a prototype or minimum viable product to entice angels. Angels don't invest as a fund (the way venture capitalists do); they are generally relatively flexible about their investment time horizon and how you run and evolve the company. Another benefit is that many angel investors can add value by providing advice or mentoring;

- **Venture Capital:** venture capital funds are beneficial in Phase 2: Company Building (as we will see further along). Scaling a company requires people, processes, and money. However, a disclaimer: raising venture capital is usually challenging, so it may only be suitable for some startups. Furthermore, the second step is to understand how to launch your minimum viable product.

3.2.2.2 Launch

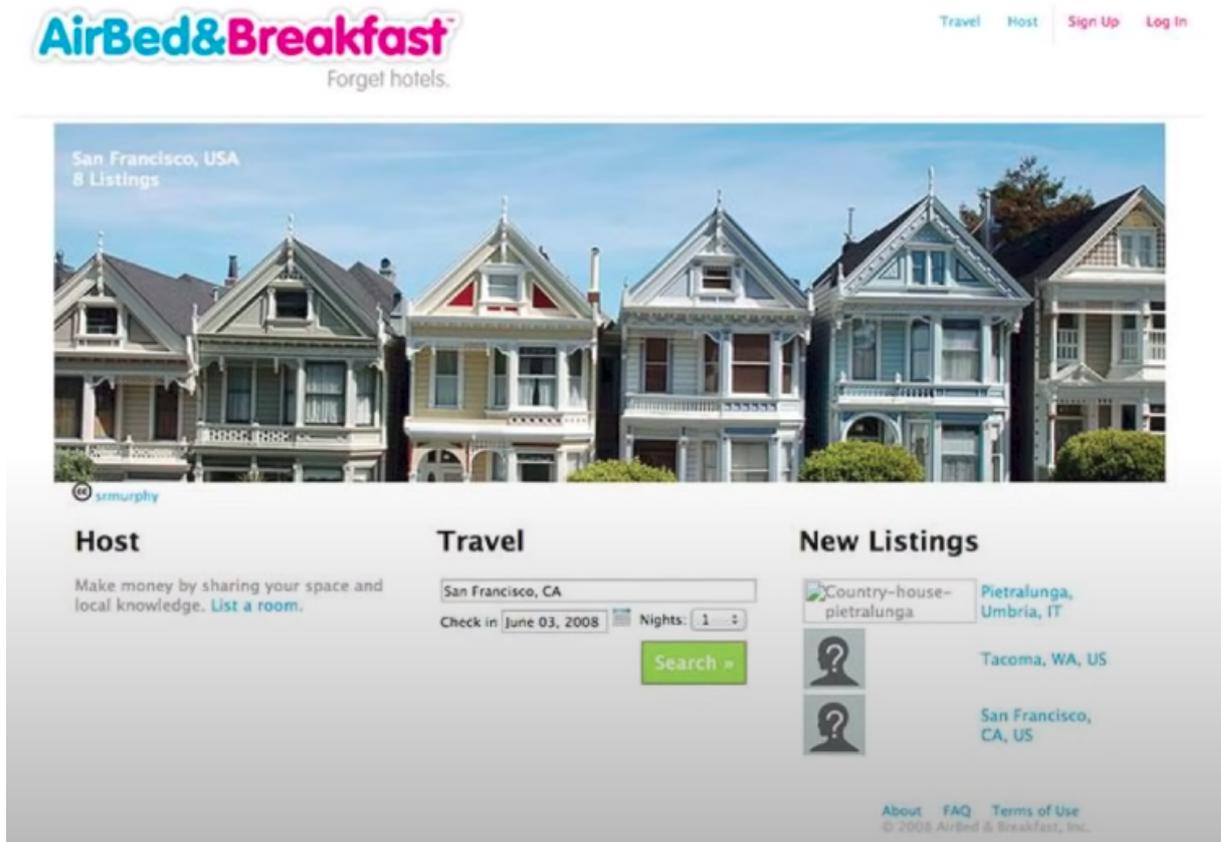
After observing and reasoning, it's time to experiment. This moment is when the Minimum Viable Product comes into place, which is the first thing you want to give your customers to see if you can deliver any value. Understanding the problem is beneficial when building an MVP, so it's expected to talk to users before making the product.

The goal is to launch fast and then iterate. In most cases, a lean MVP will have the following characteristics [17]:

- Very fast to build (weeks, not months);
- Minimal functionality (condense down what your initial user needs. A small set of users, and their highest-order problems);
- Appeal to a small set of users;
- Base to iterate from (it's not unique, you have to start).

For an example, let's look at how the company Airbnb first released its product:

Figure 5: Airbnb early days website



Source: Author's compilation.

By the time Airbnb released the product seen above, there were no payment systems on the website, no map view, and a part-time Chief Technology Officer (CTO) working on it [17]. That example shows how simple your first product can be.

The second step is to launch your MVP. To do so, Y Combinator lists good ways to do so [18]:

- **Silent launch:** release in silence. A form of doing so is to have a domain name, a company name, a short description of your startup, a contact, and a call to action;
- **Friends and family launch:** once you have an MVP, you can release it to Friends and Family as soon as possible. However, stay in this place for a short time. Your family and friends may be different from the ideal customer you are targeting. Watch them use it and ask for feedback;
- **Stranger launch:** go to a place where you can find strangers to show your product to and deliver your value;

- **Online community;**
- **Request access launch:** you make people request access to the product;
- **Social media/blogger;**
- **Pre-order;**
- **New feature/product launch;**
- **Press.**

Furthermore, it's important not to think about your release as a one-time event that needs to go perfectly [18]. For example, you probably need to find out when Google was released. Therefore, release faster and iterate. As a scientist, the entrepreneur needs to experiment.

Another important step before releasing your product is to identify your beachhead market - the first market you will conquer. Seven questions can help you define it [8].

1. Is the target customer well-funded?
2. Is the target customer readily accessible to your sales force?
3. Does the target customer have a compelling reason to buy?
4. Can you today, with the help of partners, deliver a full product?
5. Is there entrenched competition that could block you?
6. If you win this segment, can you leverage it to enter additional segments?
7. Is the market consistent with the team's values, passions, and goals?

Lastly, defining your Key Performance Indicators (KPIs) before releasing the MVP can help evaluate your success. As Peter Drucker famously said, "If you can't measure it, you can't manage it." And as a scientist, the entrepreneur needs to evaluate the results of his experiment so he can know if it validated his hypothesis.

The first metric to define is your primary metric, which will be your North Star. This metric should be the best indicator of the long-term success of your company. The following four questions can help you evaluate and decide on this metric [19]:

- Represents delivery of real value?
- Captures recurring value?
- Lagging indicator?
- Usable feedback mechanism?

Nevertheless, there're two best primary metrics [19]:

- Revenue (this is the best one);
- Active users.

An Active User will need to perform a specific action within a certain time frame to be active. Both will depend on your business, so learning about the user's crucial activities and usage time frames for your product segment may help.

After defining your primary metric, it's time to set three to five secondary metrics. Again, this will depend on your product and business model, as we will further see, so it's crucial to learn about your segment. Here is a list of Secondary metrics to help you out [19]:

- Retention;
- Revenue Churn;
- CAC;
- Payback period;
- NPS;
- Email conversion;
- Organic vs. paid users;
- Referral rate;
- Contribution margin;
- Gross margin;
- GMV;

- ACV;
- TCV;
- Burn rate.

This is just a list, and there are a ton of metrics. However, setting your primary metric is crucial because your goal is to grow it weekly. Further, set a growth rate target for your primary metric and strive to reach it every week.

With an MVP, a release method, and metrics to indicate its success, it's time to release it! After you do, you'll need to iterate and design your business triad. Product, Distribution, and Business Model will work together to constitute your Business Triad for a specific Market. Therefore, it's essential to understand that you'll need to revisit the other two if a change occurs in any of your Business Triad's three elements.

To develop your triad and then constantly evaluate and iterate it, you'll need processes:

- Product development;
- Distribution development;
- Business Model development.

For each element of the triad, you'll also need a way to validate if it fits with the other two and the market.

3.2.2.3 Product, Distribution, and Business Model development

The product is the business starting point. As Elon Musk, CEO of SpaceX and Tesla Motors, said, "The most important thing an entrepreneur can do is focus on making a great product or service. The only way to do so is by learning from the feedback loop of the market and constantly adjusting behavior" [16]. Therefore, it's time to iterate as a scientist after you release your product. At this point, the scientific method will break down as follows:

- Observation:

Observe how the customer is using your product in Interviews;

Ask questions to your customers to gather information;
 Analyze the results of your qualitative and quantitative tests;
 Document your learnings and opportunities.

- Reasoning:

Raise new hypothesis;
 Think about tests to validate or refute it;
 Define metrics.

- Experiment:

Build your experiment;
 Run your experiment.

This process will repeatedly happen in your product, distribution, and business model development.

After you've started with your product, it will need to evolve to fit your market needs, distribution channels, and business model. However, because the number of possible distribution channels and business models tends to be lower than the number of potential product iterations, matching the product to your user needs should be your ground starting. Therefore, we can draw a sequence of fits that we'll need to achieve:

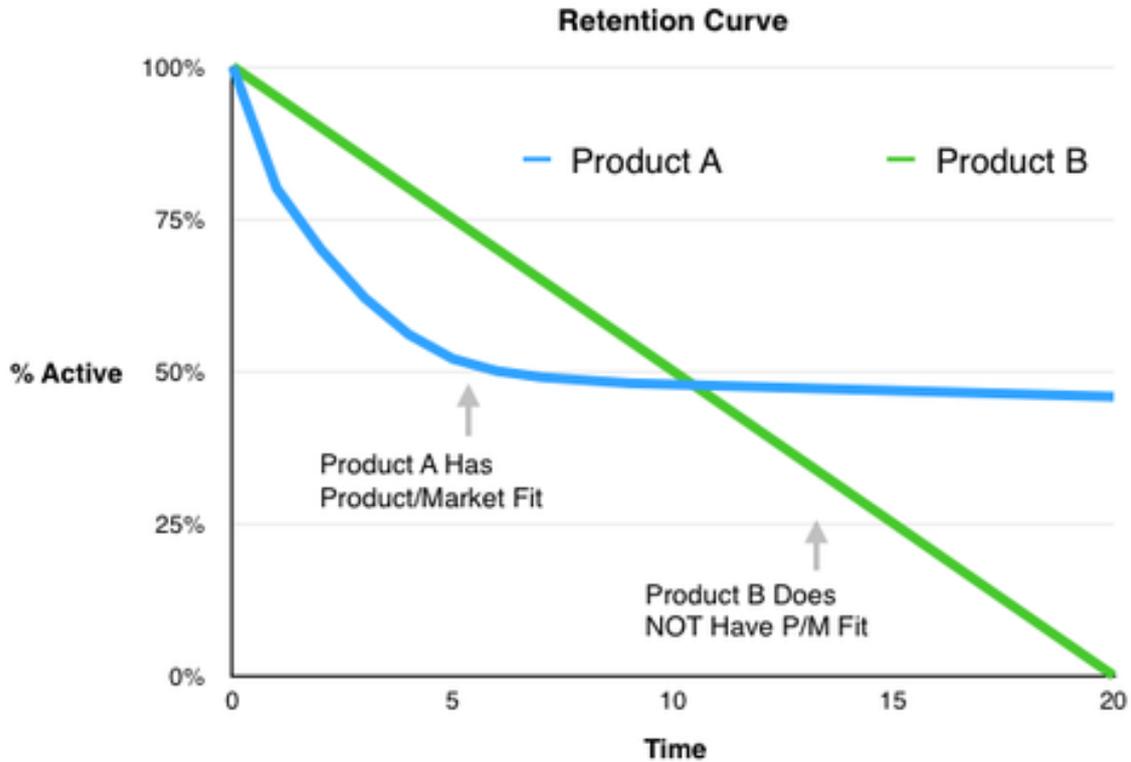
1. **Product Fits Market:** The product satisfies market needs, and we can see a stabilized retention curve as seen in the Figure 6;
2. **Distribution Fits Market and Product Adjusts to it:** A particular distribution channel can diffuse the product in this market, and the product adjusts itself to the channel;
3. **Business Model fits all:**

Distribution: A particular business model can generate enough revenue so that the income earned by each customer during its lifetime is at least three times the cost of acquiring this customer through the discovered channel [8];

Market: The market can and has the will to pay for the needed amount;

Product: The product technically implements the business model.

Figure 6: How to measure the fit between product and market



Source: Brian Balfour Article [20]

After these three fits, your Business Triad will be up and running! To help out, here is a list of possible distribution channels and business models.

Distribution Channels List according to the book Traction [21]:

- **Targeting Blogs:** Popular startups like Codecademy, Mint, and Reddit all started by targeting blogs;
- **Publicity (PR):** Publicity is the art of getting your name out via traditional media outlets like newspapers, magazines, and TV;
- **Unconventional PR:** Unconventional PR involves doing something exceptional, like publicity stunts to draw media attention. This channel can also work by repeatedly going above and beyond for your customers;
- **Search Engine Marketing (SEM):** Search engine marketing (SEM) allows companies to advertise to consumers searching on Google and other search engines;
- **Social and Display Ads:** Ads on popular sites like Reddit, YouTube, Facebook,

Twitter, and hundreds of other niche sites can be a robust and scalable way to reach new customers;

- **Offline Ads:** Offline ads include TV spots, radio commercials, billboards, infomercials, newspaper and magazine ads, as well as flyers and other local advertisements. These ads reach demographics that are harder to target online, like seniors, less tech-savvy consumers, and commuters. Only some startups use this channel, so there's less competition for many of these audiences;
- **Search Engine Optimization (SEO):** Search engine optimization (SEO) is ensuring your Website shows up for key search results;
- **Content Marketing:** Many startups have blogs. However, only some use their blogs to get traction;
- **Email Marketing:** Email marketing is one of the best ways to convert prospects while retaining and monetizing existing customers;
- **Engineering as Marketing:** Using engineering resources to acquire customers is a significantly underutilized way to get traction. Successful companies have built microsites, developed widgets, and created free tools that drive thousands of monthly leads;
- **Viral Marketing:** Viral marketing grows your customer base by encouraging customers to refer other customers;
- **Business Development (BD):** Business development (BD) creates strategic relationships that benefit your startup and your partner;
- **Sales:** Sales primarily focuses on creating processes to exchange products for dollars directly;
- **Affiliate Programs:** Companies like HostGator, GoDaddy, and Sprout Social have robust affiliate programs that have allowed them to reach hundreds of thousands of customers cost-effectively;
- **Existing Platforms:** Focusing on existing platforms means focusing your growth efforts on mega-platforms like Facebook, Twitter, or the App Store and getting some of their hundreds of millions of users to use your product;
- **Trade Shows:** Trade shows are a chance for companies in specific industries to show off their latest products;

- **Offline Events:** Sponsoring or running offline events—from small meetups to large conferences—can be a primary way to get traction;
- **Speaking Engagements:** Eric Ries, author of the bestselling book *The Lean Startup*, said he used speaking engagements to hit the bestseller list within a week of his book's launch;
- **Community Building:** Companies like Wikipedia and Stack Exchange have grown by forming passionate communities around their products.

The utilized bibliography it's worthy of a complete reading [21].

Going further, below is a list of Nine Possible Business Models Verticals presented by Y Combinator [22]:

- **Enterprise:** the company that sells services or software to other businesses on a single-license basis. These contracts have fixed terms and designated contract values and come up for renewal at the end of the period;
- **SaaS (software-as-a-service):** Company sells subscription-based licenses for a cloud-hosted software solution;
- **Usage-based:** company charges customers only when they use the product or service;
- **Subscription:** company sells a product or service, usually to a customer, on a recurring basis;
- **Transactional:** company enables a financial transaction on behalf of a customer and collects a fee;
- **Marketplace:** company acts as an intermediary in the sale of a good or service between sellers and buyers, generally collecting a percent of the total transaction value;
- **E-commerce:** company sells physical goods online. Generally, e-commerce companies manufacture and inventory those goods;
- **Advertising:** The company offers a free service to consumers and derives revenue entirely or predominantly from advertisers. Familiar advertising companies include social networks and content sites;

- **Hardware:** company sells physical devices to consumers or businesses.

Watch the whole video also to get the metrics that they recommend to track for each Business Model.

3.2.3 Phase 2: Company Building

Once you have found a Business Triad for a specific market, can see a path to reach a big scale, and have reached at least USD 1 million in revenue [23], it's a good time to scale; to do so, you'll need to build a company. To create a scaled company, you'll need three things:

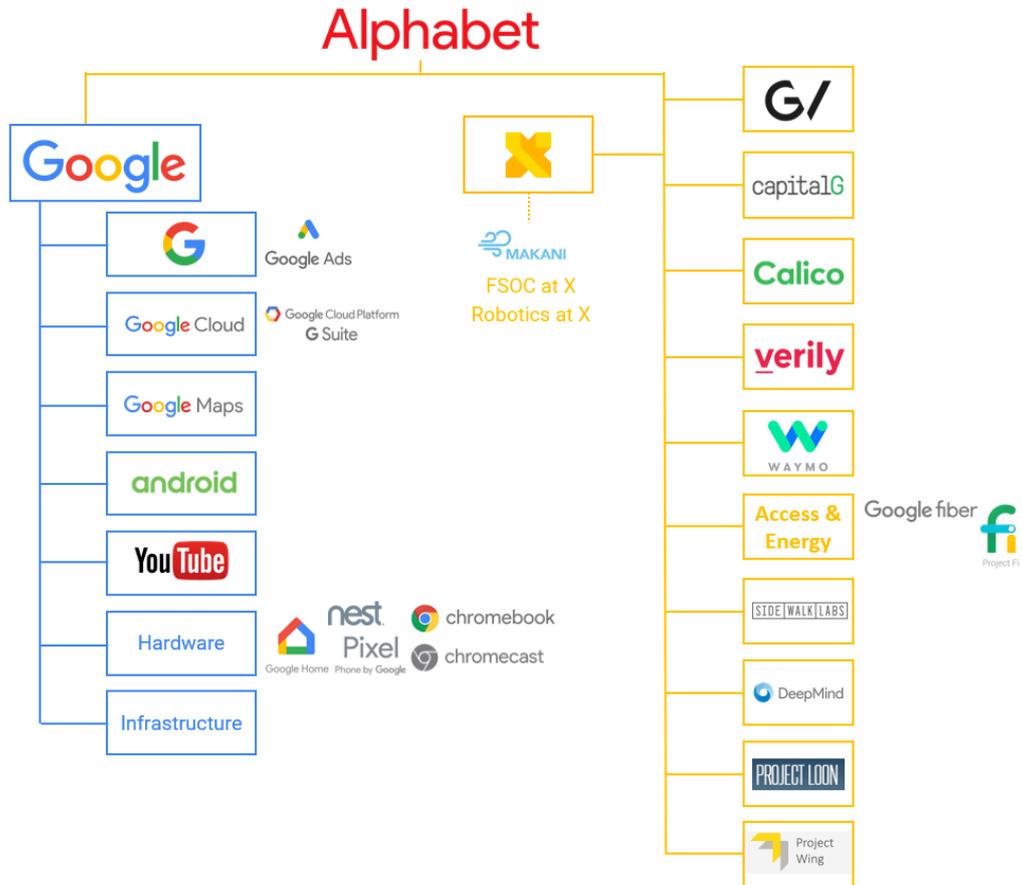
- Money;
- People;
- Processes.

An excellent reference for acquiring this knowledge is the book *The Great CEO Within* [23]. It's worth reading it.

3.2.4 Phase 3: New Products

Once a company has scaled to serve a big market, it's time to use the profit from the developed business triad to create new ones. A great example of this is Google. Although it started with the search engine product, it eventually developed itself to create multiple products in multiple verticals.

Figure 7: Alphabet Organizational Chart



Source: DBInsights Article [24]

PART IV

CASE STUDY: UMATCH

4 CASE STUDY: UMATCH

This case study documents the development of Umatch, a dating network for college students which I founded. Launched on September 27, 2020, Umatch has grown rapidly, acquiring over 500,000 users in three years.

Now in its Company Building phase, Umatch exemplifies the practical application of the Business Triad Search, central to the Scientific Entrepreneur Method. The study focuses on:

1. The formation of the initial Idea, Team, and securing Funding, incorporating user interview methods detailed in this thesis;
2. The deployment of the Minimal Viable Product (MVP) concept and strategic launch;
3. The progression from MVP validation to establishing effective distribution channels and a business model, forming Umatch's first Business Triad.

This study aims to provide a pragmatic view of the Business Triad search, demonstrating the application of theoretical principles in a real-world setting. My direct experience with Umatch offers unique insights into this process, blending personal entrepreneurship experience with academic analysis.

4.1 Phase 1: Business Triad Search

The present section will present how we went through the first phase of the Scientific Entrepreneur Journey: the business triad search.

Genesis of Umatch: Idea, Team, and Money

It was August 2019, during my third year in the Computer Engineering course at the University of São Paulo, that the seeds of my entrepreneurial journey were sown. An old

dream to start a company, rooted in childhood aspirations of being an inventor, began to take shape. This dream, intertwined with my experiences as a professional athlete, a path influenced by my mother's career in Brazilian gymnastics, evolved into a desire to create technology companies aimed at benefiting humanity.

Fueled by this ambition, I discussed startup ideas with a friend, focusing on the college student demographic. An intriguing suggestion emerged: the need for a dating app exclusively for college students, a concept echoed in social media requests. This idea resonated with me due to several factors: my direct access to this audience, the vast number of college students in Brazil (over 8.6 million), the absence of such a product in the market, and the potential to develop this app with minimal investment and the right team. Inspired, I returned home and designed the first logo for the company, marking the inception of what would later become Umatch.

Figure 8: Umatch's first logo



Source: Author's creation.

Figure 9: Umatch’s first logo iteration



Source: Author’s creation.

However, aligning with the principles outlined in this thesis, the journey should not commence with a solution but with understanding the problem. To grasp the underlying issues behind this user request, we needed market validation and user interviews, as advocated by the methodologies discussed here. This realization came before I delved deeper into market research, at which point I met my future co-founder.

4.1.1.1 Team and Research

Over the next 30 days, the idea continuously percolated in my mind. Serendipitously, a friend introduced me to Cayo Syllós, who would become my co-founder and the Chief Technology Officer of Umatch. Sharing with him my vision, we both found common ground in our determination to build something impactful. This partnership laid the cornerstone of our venture.

Together, we embarked on a journey of understanding our target users. We conducted interviews with friends and family, employing methods akin to those presented in this thesis. These conversations validated our initial assumptions:

- College students were keen on dating peers from their own community;
- Female students, in particular, expressed concerns about the safety and security of existing dating platforms.

This led us to formulate our initial hypothesis for Umatch:

- **Problem:** College students seeking to date peers lacked a dedicated platform.
- **Solution:** An exclusive dating app for college students, enabling them to discover, match, and chat within their community.
- **Insight:** Seize the opportunity to be a first mover in this niche.

4.1.0.2 Money

Initiating our venture required capital, albeit modest. We managed to pool together approximately USD 1.2k, a sum sufficient to develop and launch our product. Our programming skills were a significant advantage, allowing us to build the application with minimal financial input.

4.1.1 Launch

Having confirmed with the **Market** the existence of the problem, our next steps involved conceptualizing the Minimum Viable Product (MVP) and devising a launch strategy. This was crucial for initiating the development of the Business Triad and validating the first crucial fit: product-market compatibility.

4.1.1.1 MVP Development

Our Business Triad hypothesis at this juncture was as follows:

1. **Product:** A dating app exclusively for college students, offering enhanced safety features for female users.
2. **Distribution:** Growth driven by word-of-mouth and partnerships with college groups.
3. **Business Model:** Adopting the subscription model prevalent in the dating industry, with the hypothesis that this approach would be viable for our market.

As previously discussed, the scientific entrepreneur embarks on the validation journey starting with the product, primarily focusing on the retention curve.

Our MVP needed to encapsulate the essence of our product hypothesis: a safe, exclusive dating platform for college students. The minimum features required to test this hypothesis were:

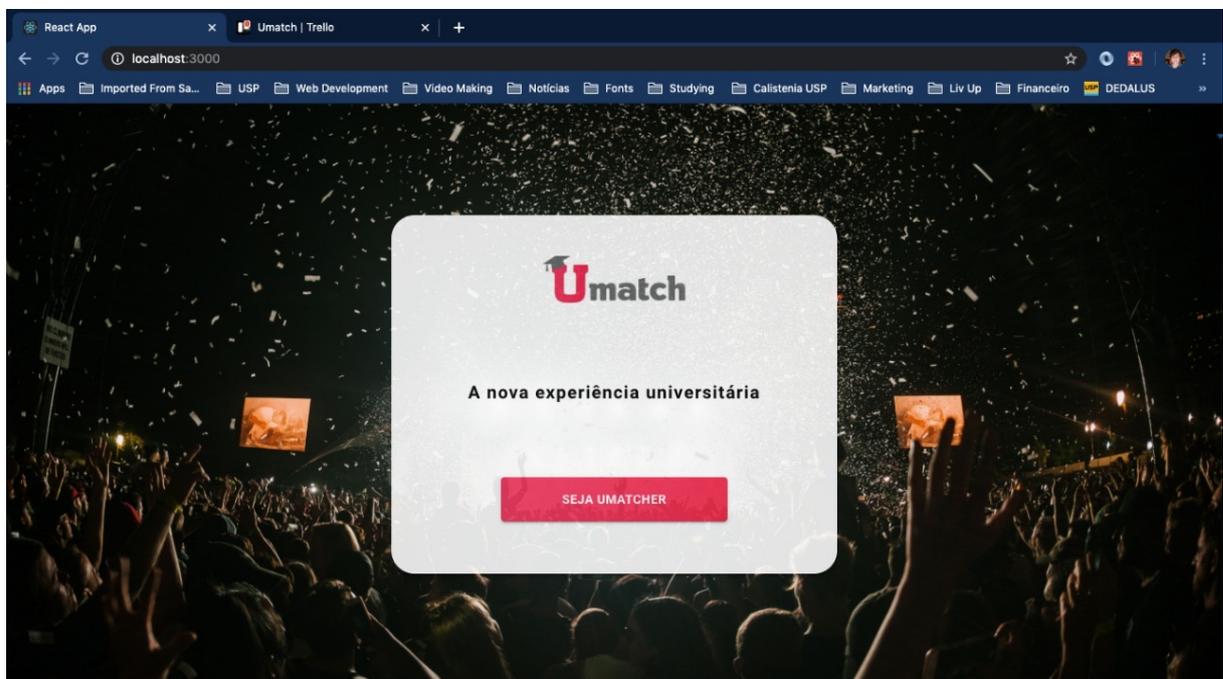
1. A verification system to ensure all users are college students.
2. A swiping mechanism for users to express mutual interest.
3. A messaging feature enabling users to communicate.
4. Profile customization options.
5. An initial user base, essential for testing the network's value proposition to college students.

Given these requirements, our launch strategy naturally evolved into a pre-registration campaign, ensuring a foundational user base was in place for effective MVP testing.

4.1.1.2 Pre-registration: the Release Strategy

The first step in our pre-registration strategy involved designing and programming the landing page. Leveraging my access to 47 college groups at the University of São Paulo on Facebook, I initiated a robust social media campaign to promote the page.

Figure 10: Pre-registration home page



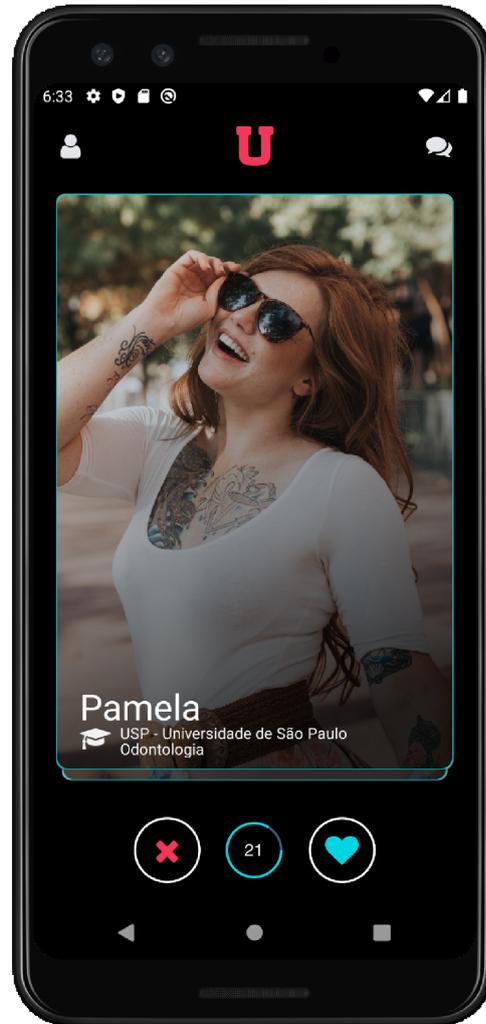
Source: Author's archives.

This effort quickly bore fruit, yielding the first 500 pre-registrations within weeks. Buoyed by this early success, we implemented an affiliate program to further disseminate the pre-registration link, culminating in over 9,000 sign-ups.

4.1.1.3 Product Release

Concurrent with the pre-registration phase, we embarked on the development of our MVP. The following images showcase the initial version of the Umatch app.

Figure 11: Umatch's MVP



Source: Author's archives.

In line with the guidance provided in this thesis, we sought expertise from a seasoned entrepreneur in the dating industry to identify key performance metrics. This led us to focus on the DAU/MAU ratio (Daily Active Users over Monthly Active Users), a critical measure of user engagement and app stickiness. An impressive ratio exceeding 15% would signify a strong market presence for a dating app.

4.1.1.4 Product, Distribution, and Business Model Development

Post-launch, Umatch achieved a DAU/MAU ratio exceeding 40%, indicating a highly successful market entry and a product with significant appeal.

However, as the thesis emphasizes, the true indicator of Product-Market fit is a stable retention curve. After 30 days, our data indicated such stabilization, although privacy concerns preclude its display here.

Following this, we diligently applied the Scientific Entrepreneur Method to refine our product, identify effective distribution channels, and develop a sustainable business model – the core components of our Business Triad:

1. **Product:** A dating app exclusive for college students.
2. **Distribution:** Effective outreach through college groups and an invite-only model.
3. **Business Model:** A subscription-based model with a freemium approach within the app.

Adaptation was key; the product evolved to suit our distribution strategies, particularly the invite-only model, which integrated in-app functionalities to encourage user referrals.

Validating our subscription model involved rigorous testing and benchmarking against industry standards. The results confirmed a high conversion rate and a Lifetime Value (LTV) of users exceeding thrice the Customer Acquisition Cost (CAC).

With a validated Business Triad in place, Umatch was poised for scaling, leading us to pursue additional funding.

4.1.1.5 Results

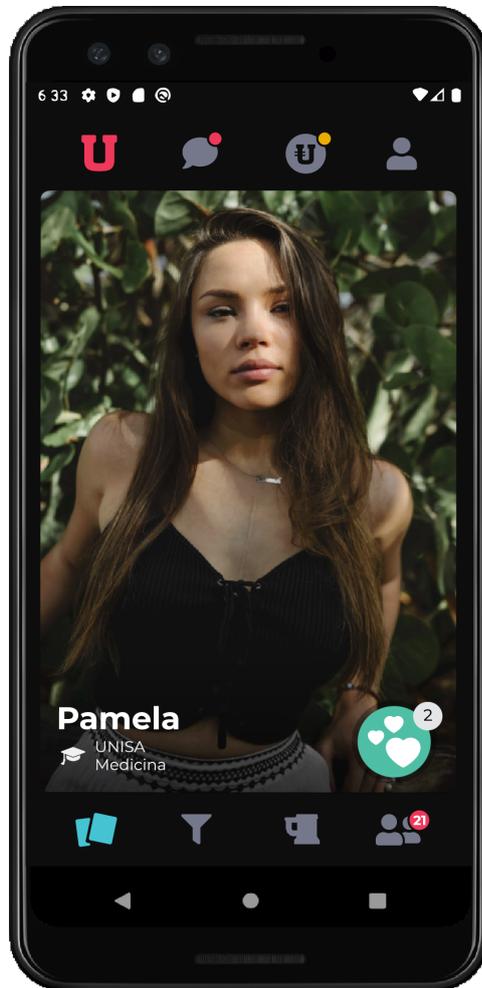
Below are images showcasing the evolution of Umatch's branding, product iterations, and user base growth.

Figure 12: Umatch's Current Logo

Umatch

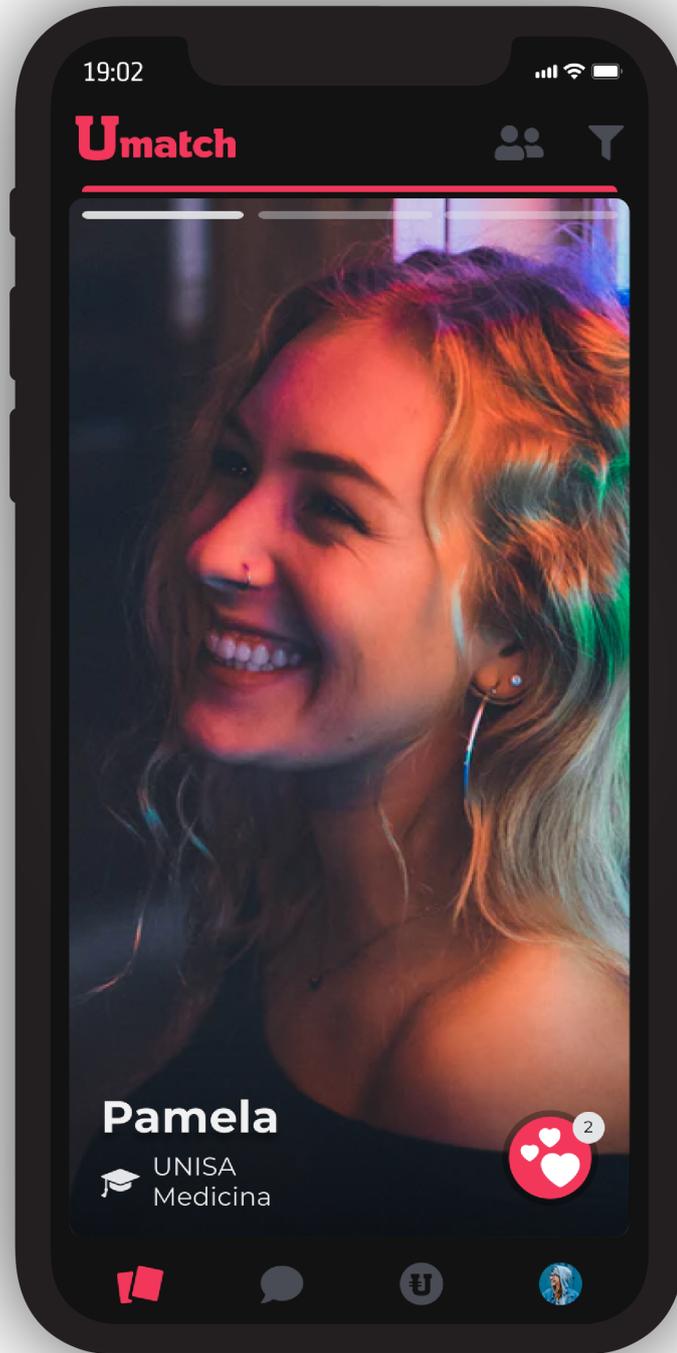
Source: Author's archives.

Figure 13: Umatch's Second Version



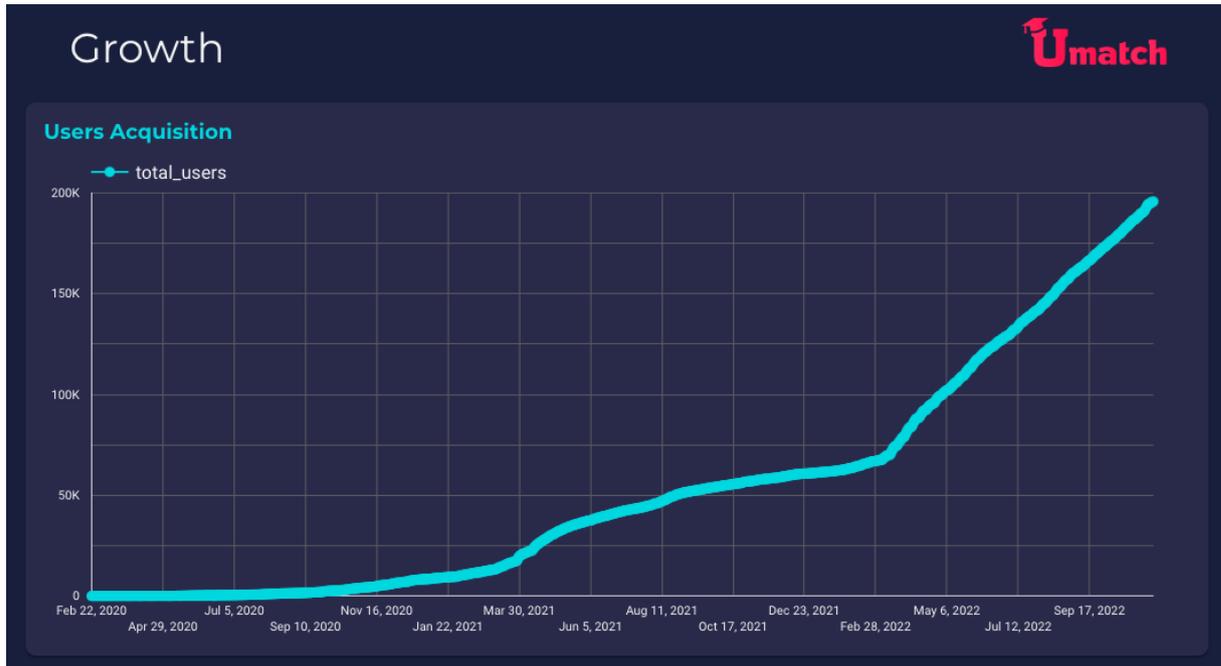
Source: Author's archives.

Figure 14: Umatch's Current Version



Source: Author's archives.

Figure 15: Umatch's User Base Growth Curve



Source: Author's archives.

4.2 Phase 2: Company Building

Umatch has now transitioned into the Company Building phase. With a robust Business Triad established, our focus shifts to scaling Umatch. This phase involves enhancing internal processes, recruiting talent, and securing additional funding to fuel our growth, while improving our Business Triad.

4.3 Conclusion of the Case Study: Umatch

This case study of Umatch serves not only as a practical application of the Scientific Entrepreneur Method but also as a testament to the entrepreneurial journey's multi-faceted nature. From the conceptualization of the idea to the realization of a functioning product, and eventually scaling up to a sustainable business model, Umatch embodies the entrepreneurial traits and methods discussed earlier in the thesis.

4.3.1 Key Findings and Reflections

- The **Business Triad** concept was crucial in guiding Umatch's development. Aligning the product, distribution channels, and business model was a dynamic pro-

cess that underscored the importance of flexibility and responsiveness in the entrepreneurial journey.

- The **Market Validation** phase, highlighted by the pre-registration strategy and user interviews, was pivotal in shaping the MVP. It provided critical insights into the market needs, especially underscoring the safety concerns of female college students.
- The **MVP Development** and subsequent iterations demonstrated the iterative nature of product development in a startup environment. Adapting the product based on user feedback was essential for enhancing user engagement and retention.

4.3.2 Implications and Applications

- The success of Umatch validates the Scientific Entrepreneur Method, illustrating how a structured approach to entrepreneurship can effectively bridge the gap between a theoretical framework and practical implementation.
- The case study highlights the importance of starting with a well-defined problem, rather than a preconceived solution. This approach can lead to more sustainable and market-driven products or services.
- Umatch's journey underscores the need for continuous learning and adaptation. The entrepreneurial path is non-linear, requiring constant adjustments based on market feedback and internal analyses.

In conclusion, the Umatch case study not only corroborates the theoretical aspects discussed in this thesis but also provides valuable insights into the real-world challenges and triumphs of entrepreneurship. It emphasizes the significance of market alignment, iterative development, and strategic planning in the creation and scaling of a technology startup. As Umatch progresses into its Company Building phase, it continues to embody the principles of the Scientific Entrepreneur Method, offering a living example of how theoretical concepts can effectively guide entrepreneurial endeavors.

PART V

CONCLUSION

5 CONCLUSION

The importance of viewing an entrepreneur as a scientist is to embrace the unknown on the entrepreneurial journey. Scientists are used to assuming that they don't know how the world works; therefore, they rely on a systematic approach to develop knowledge. Thus, in the same way, an entrepreneur that understands himself as a scientist sees his initial company as a pool of hypotheses rather than a rigorous system that aims to follow a 50-page well-defined business plan. Furthermore, the scientific entrepreneur faces his idea and solution as a belief that only real-world experiments can accept or reject, just like scientists have done for centuries.

Entrepreneurs can now know that what matters in the early stage of a startup is the Business Triad. And, because this clarity of thought can differ between the life and death of a new technological breakthrough or big startup, it can enable entrepreneurs to surpass barriers and improve human life on earth.

Leonardo Da Vinci once said, *Simplicity is the ultimate sophistication*. Therefore, this essay comes to an end with the achieved goal of documenting a method that clearly states what is essential for a startup founder to focus on in the early stage of their company.

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